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Subject: Survey of Fire-Damaged Timber on the Hayfork and Big Bar Ranger Districts, Shasta-Trinity National Forests.
(Report No. 88 - 15)

To: Forest Supervisor, Shasta-Trinity National Forests

At the request of Jerry Brogan, Timber Management Officer, Shasta-Trinity National Forests, Dave Schultz, entomologist and James Allison, plant pathologist examined several burn sites on the Hayfork and Big Bar Ranger Districts on March 22-23, 1988. They were accompanied by Jeff Bryant, Mike Birch and Pete Fisher on the Hayfork Ranger District, and by Charles Fitch, District Ranger, on the Big Bar Ranger District. The burn areas on the Hayfork Ranger District were previously examined by Forest Pest Management in the fall of 1987. The objectives of this examination were to determine the adequacy of the marking guidelines as set down in fire salvage guidelines (see 3400 letter of September 30, 1987), and to determine the extent of bark and engrave beetle activity in the burn sites.

Fire-damaged trees in natural stands, plantations and wilderness areas were examined for evidence of cambial damage and for the presence of insect activity. Numerous trees marked as leave trees because of relatively undamaged crowns and minor charring of the stem have died. An examination of the base of these trees revealed that the cambial layer was dead around more than 25% of the stem circumference. As the weather warmed during the spring of 1988, additional trees marked last fall have faded in areas of medium and light intensity burns. Although some of these trees showed little outward sign of serious fire damage, we observed cambial injury severe enough that the trees have basically been dead all winter. This situation might be compared to that of a freshly cut Christmas tree which appears remarkable healthy until exposed to several weeks of warm, dry conditions. The last of the green-crowned, fire-killed trees should have faded by June or early July, even at the highest elevations.

Trees damaged by fire can be placed into three broad classes; trees killed immediately by the fire, trees visibly injured, and trees with insignificant or no injury. Trees visibly injured are on the borderline of the "will die/will survive" criteria. Our observations indicated that an individual tree mark on an injured tree was likely to be correct on survival about 50% of the time. The intermediate category of injured trees can provide an opportunity for attack by bark beetles and flatheaded borers and presents a challenge to the timber marker. The marking guidelines appeared to have been applied correctly. If anything, the markers tended to make conservative estimates of potential mortality. As a result, crews had to remark stands where additional mortality

is now occurring. It would take some training, more intensive sampling, and an increased investment of several minutes per tree to assess the extent of cambial injury (dead cambium is dry and discolored and the adjacent wood is often infiltrated with resin) and therefore to discriminate between the dead, severely injured, and moderately injured trees.

Insect activity was very low in trees damaged by the fires. There has been some limited attacks by western pine beetle, Dendroctonus brevicomis, and red turpentine beetle, D. valens, on pines.

A number of common bark and engraver beetle and borers are usually present at low numbers on the Hayfork and Big Bar Ranger Districts. The probability of beetle attack will increase with the number of other stress factors affecting the trees. Depending upon the tree species, tree size, and species of beetle involved, the trees may fade as early as August, 1988 or as late as 1992.

Precipitation during the last two winters has been significantly lower than normal. Consequently, most of the trees have been under moisture stress. The magnitude of the tree mortality has just begun to become apparent. Many of these trees died last summer or early fall but the crowns did not fade until this spring because the weather was cool and damp. Most of the mortality occurred as scattered individuals or as small groups of trees. The mortality was more evident along ridges and other areas having shallow soils, in transition zones between types and in off-site stands, and along dried-up water courses.

If you need additional input on this subject, please contact either Dave Schultz or James Allison directly at 415-556-6520.

~~John Neisess~~

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